

# PATTERNS IN PHARMA DA – AN EXAMPLE FROM ABBOTT LABORATORIES

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## Agenda

- ◆ Brief overview of pharma development – the nature of the problem
- ◆ Team composition and process
- ◆ Problem scope and structuring
- ◆ Typical results
- ◆ Patterns in Decision Quality

*“In theory, there is no difference between theory and practice; In practice, there is.” - Chuck Reid*

Drug development is well suited to a DA approach because of long timelines, significant uncertainties and large investments.

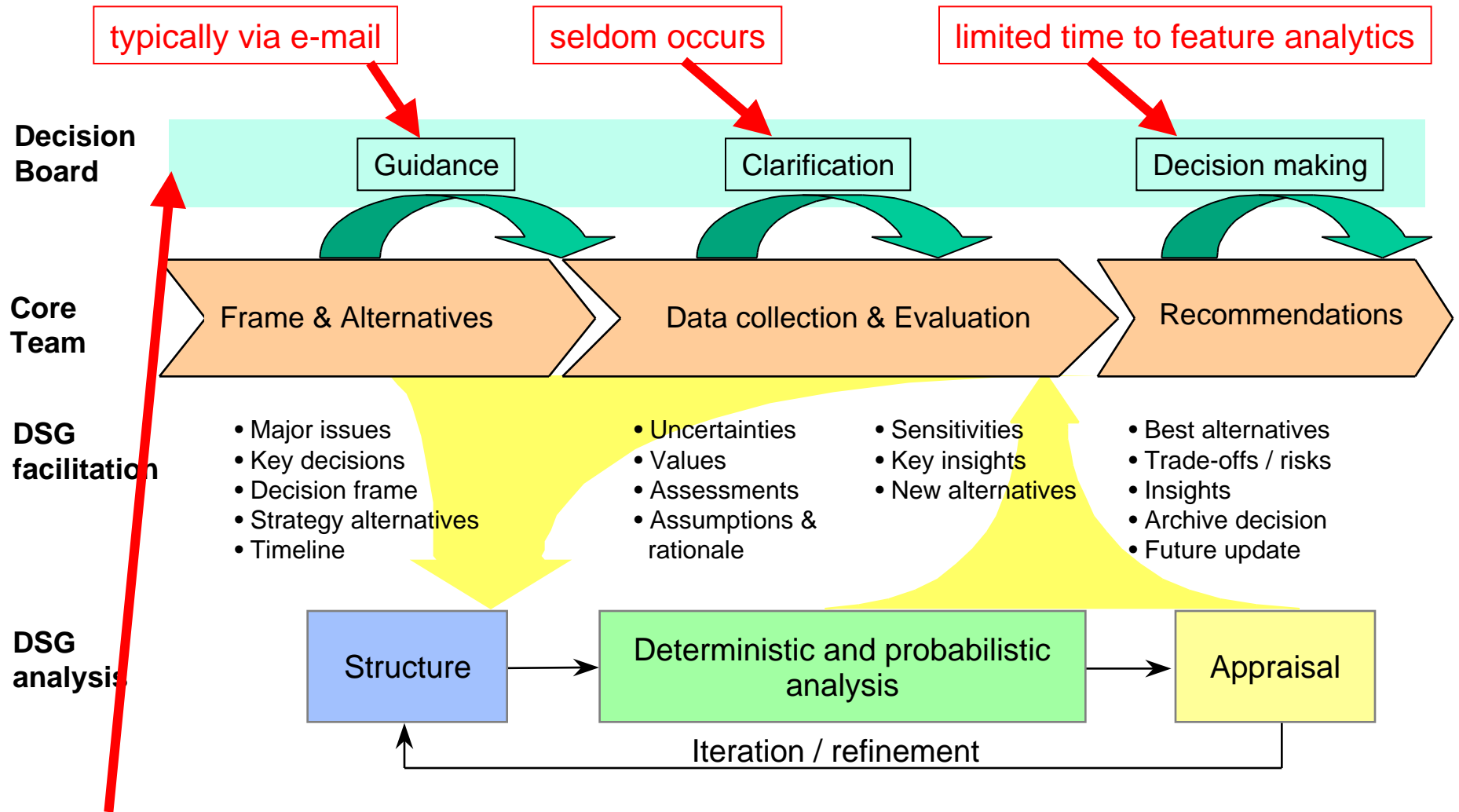
Early Research / Preclinical testing		Clinical trials			FDA		Phase IV
		Phase I	Phase II	Phase III			
<b>Years</b>	6.5	1.5	2	3.5	1.5	15 total	
<b>Test Population</b>	Laboratory and animal studies	20 to 80 healthy volunteers	100 to 300 patient volunteers	1,000 to 3,000 patient volunteers	Regulatory review and approval		Additional post-marketing testing and/or additional indications or uses
<b>Purpose</b>	Assess safety and biological activity	Determine safety and dosage	Evaluate efficacy & side effects. Finalize dose.	Confirm efficacy, safety and adverse events			
<b>Success Rate</b>	5000 compounds evaluated	5 compounds enter trials			1 approved		

\$50 - \$100MM	\$300MM - \$500MM	\$5MM - \$50MM
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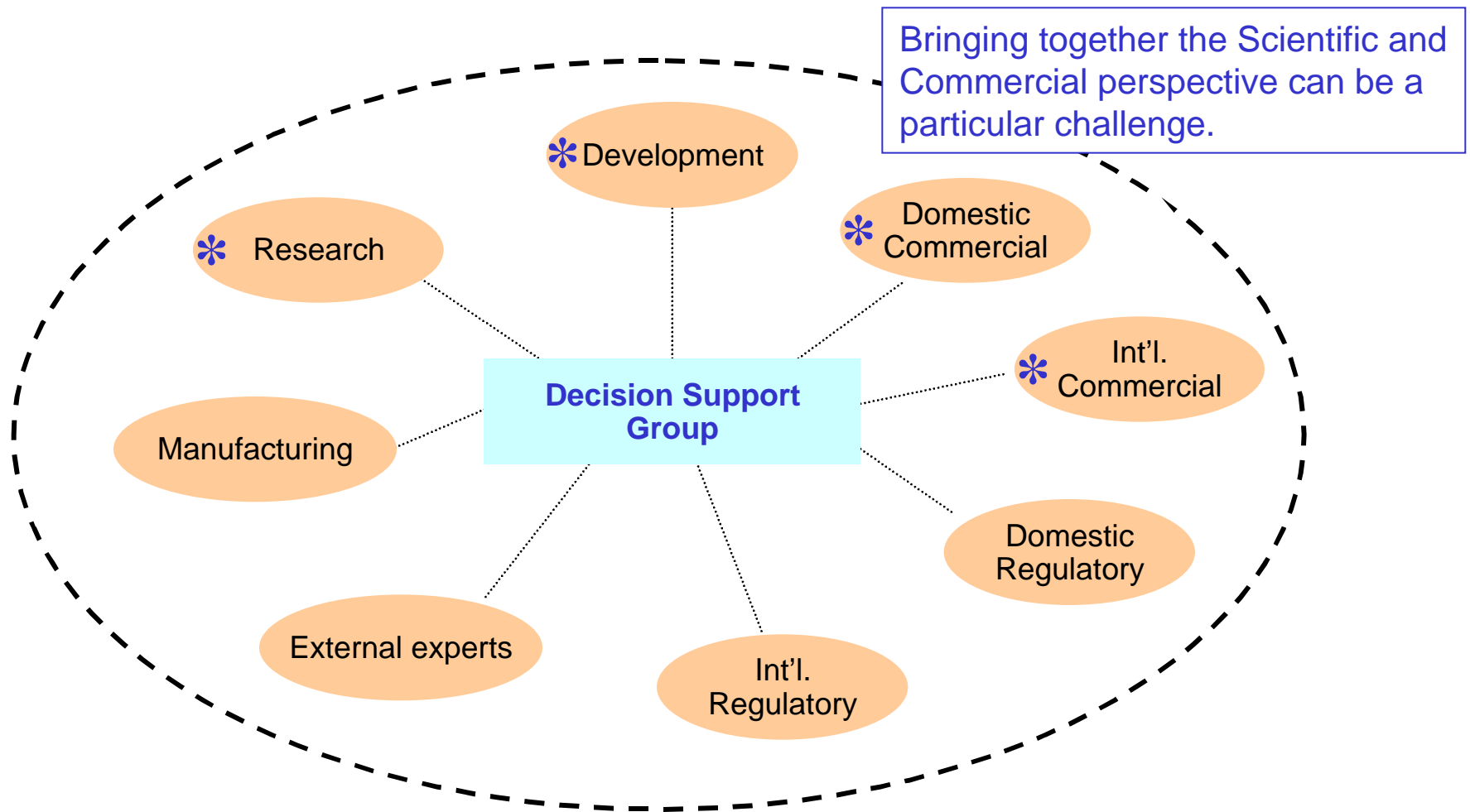
*Life is a long lesson in humility. -James M. Barrie, writer (1860-1937)*

Because of high time demands on top decision makers, a highly interactive process is hard to achieve.



Pre-meetings with key stake-holders and/or decision makers helps to manage the availability constraints and forestall precipitous actions.

The core team typically includes individuals responsible for the development, approval and launch of a drug.



*The influence of each human being on others in this life is a kind of immortality. -John Quincy Adams, 6th president of the U.S. (1767-1848)*

For routine phase-gate milestones, the decision options are fairly predictable, but sometimes “unique events” occur that dictate a different set of options.

Decision Types	Decision options “routine milestone”	Decision options “unique event”
<b><i>Givens, Values, or Expectations</i></b>	<ul style="list-style-type: none"> <li>◆ eNPV, EPS, development cost, productivity</li> <li>◆ Maximize compound value</li> </ul>	<ul style="list-style-type: none"> <li>◆ eNPV, EPS, development cost, productivity</li> <li>◆ Therapeutic area commitment</li> <li>◆ Respond to the “unique event”</li> </ul>
<b><i>Strategic Decisions</i></b>	<ul style="list-style-type: none"> <li>◆ Which indications and how many at launch?</li> <li>◆ How to formulate and at what dosing types?</li> <li>◆ What are the pre- and post launch buy-up options? Follow-on compound(s)?</li> <li>◆ Provider segments (community or hospital, specialist?)</li> <li>◆ Patient segments</li> <li>◆ Geography</li> </ul>	<ul style="list-style-type: none"> <li>◆ Decision options are dictated by the nature of the problem, but usually revolve around an unexpected upside or downside finding in efficacy, safety or due to an unanticipated regulatory response.</li> <li>◆ Should the back up compound be brought forward?</li> <li>◆ Should additional testing be undertaken? Value of information</li> </ul>
<b><i>Tactics or Decide Later</i></b>	<ul style="list-style-type: none"> <li>◆ Branding and packaging options</li> <li>◆ Advertising and marketing plans</li> <li>◆ Clinical trial designs</li> <li>◆ Partnering options</li> </ul>	

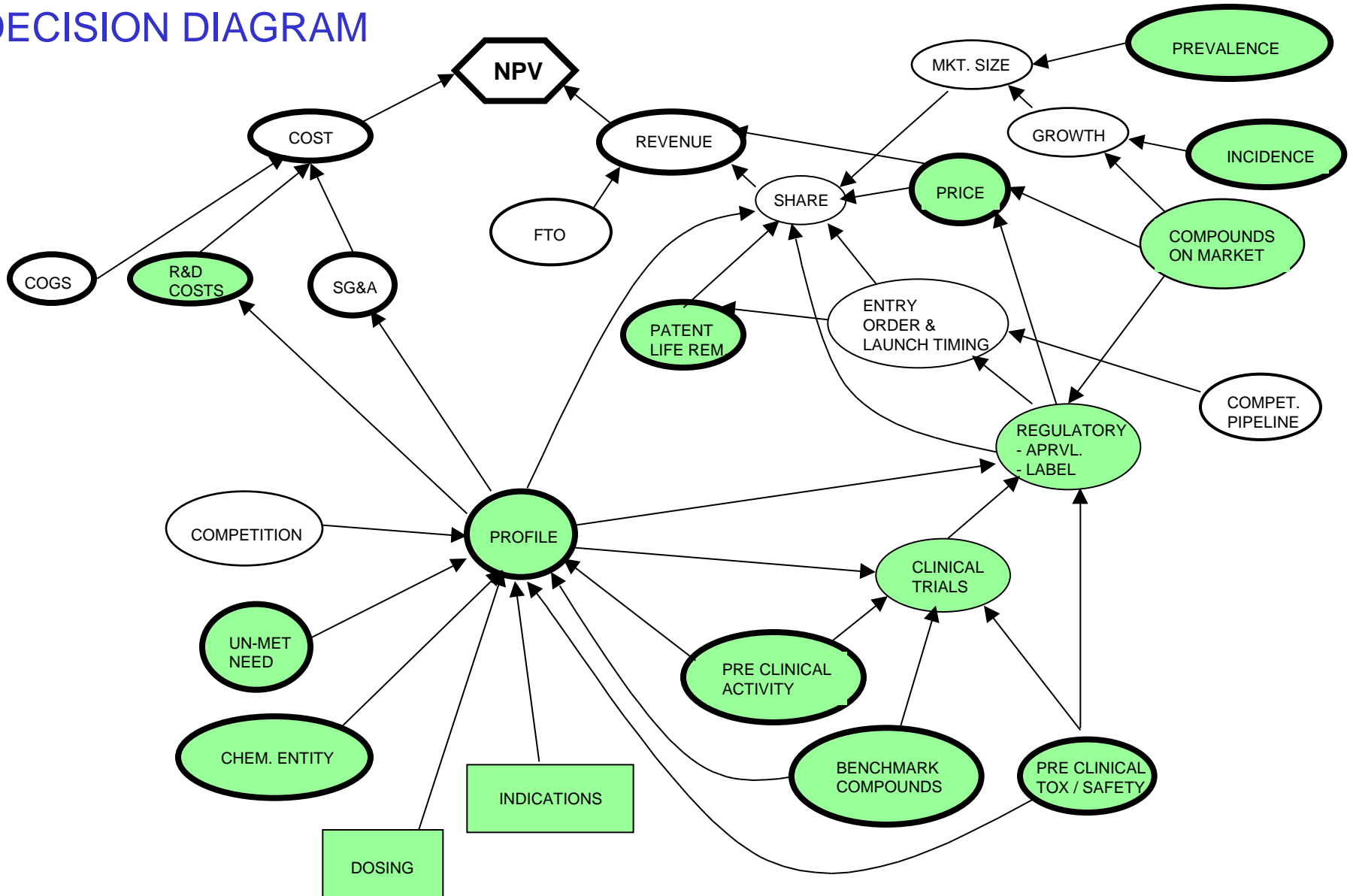
***In pharma, Future options ≠ Real Options***

For compounds in phase-II development, strategy alternatives tend to revolve around how to invest in expensive Phase-III clinical trials.

- ◆ **Momentum; typical for the pharma industry**
  - Single major indication: ASAP. Limited post-launch indications.
  - U.S. and major European markets in community patients.
  - Adults first, followed some time later with peds. if appropriate.
- ◆ **Buy – up; enhancing value**
  - Lead indication, followed by other indications: ASAP.
  - All WW markets in both hospital and community patient populations.
  - Adults first, followed by pediatric claims.
  - Quickly initiate post-launch life-cycle management with follow-on compounds, enhanced dosage forms, etc.
- ◆ **Buy – down; managing risk**
  - Lowest risk indication focused on one major market & patient population.
  - Potential out-license of other markets and/or indications. Defray risk via co-development partnering.
  - Delay post-launch product enhancements.

*The man who is denied the opportunity of taking decisions of importance begins to regard as important the decisions he is allowed to take. -C. Northcote Parkinson, author and historian (1909-1993)*

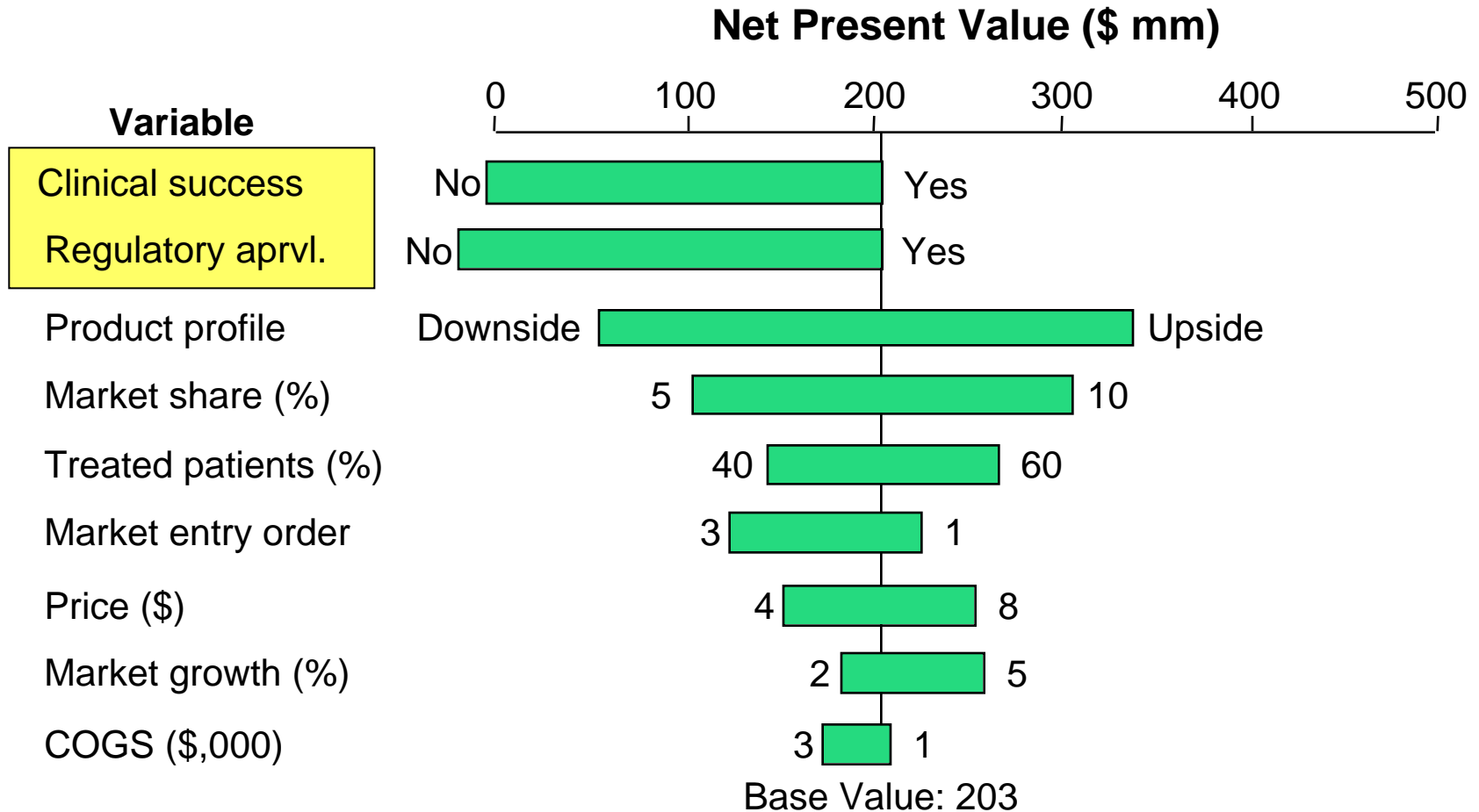
# DECISION DIAGRAM



*"I think...I think it's in my basement. Let me go upstairs and check." -M.C. Escher (1898-1972)*

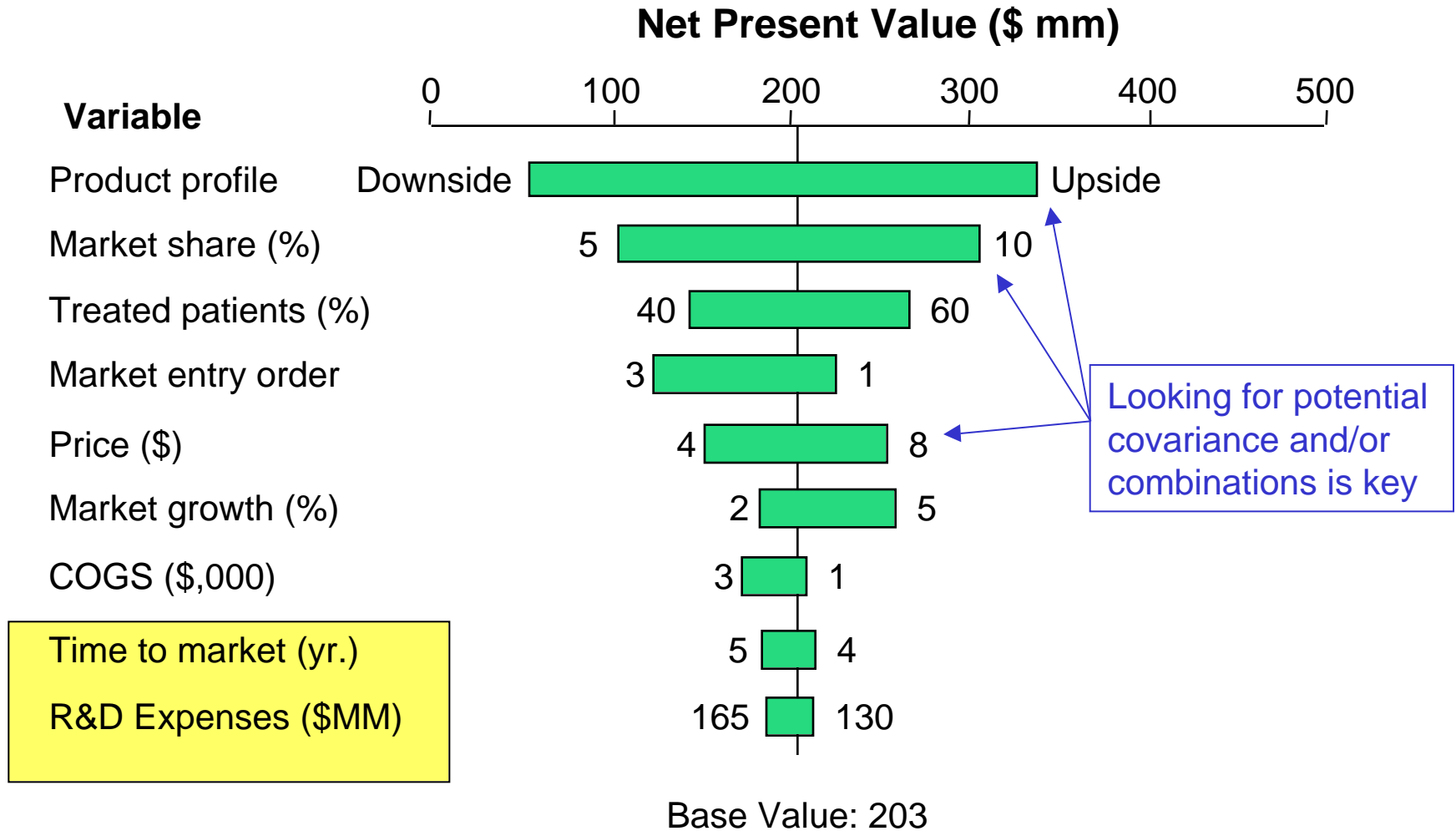


Typical driver uncertainties are discrete clinical/regulatory success variables, and product profile.



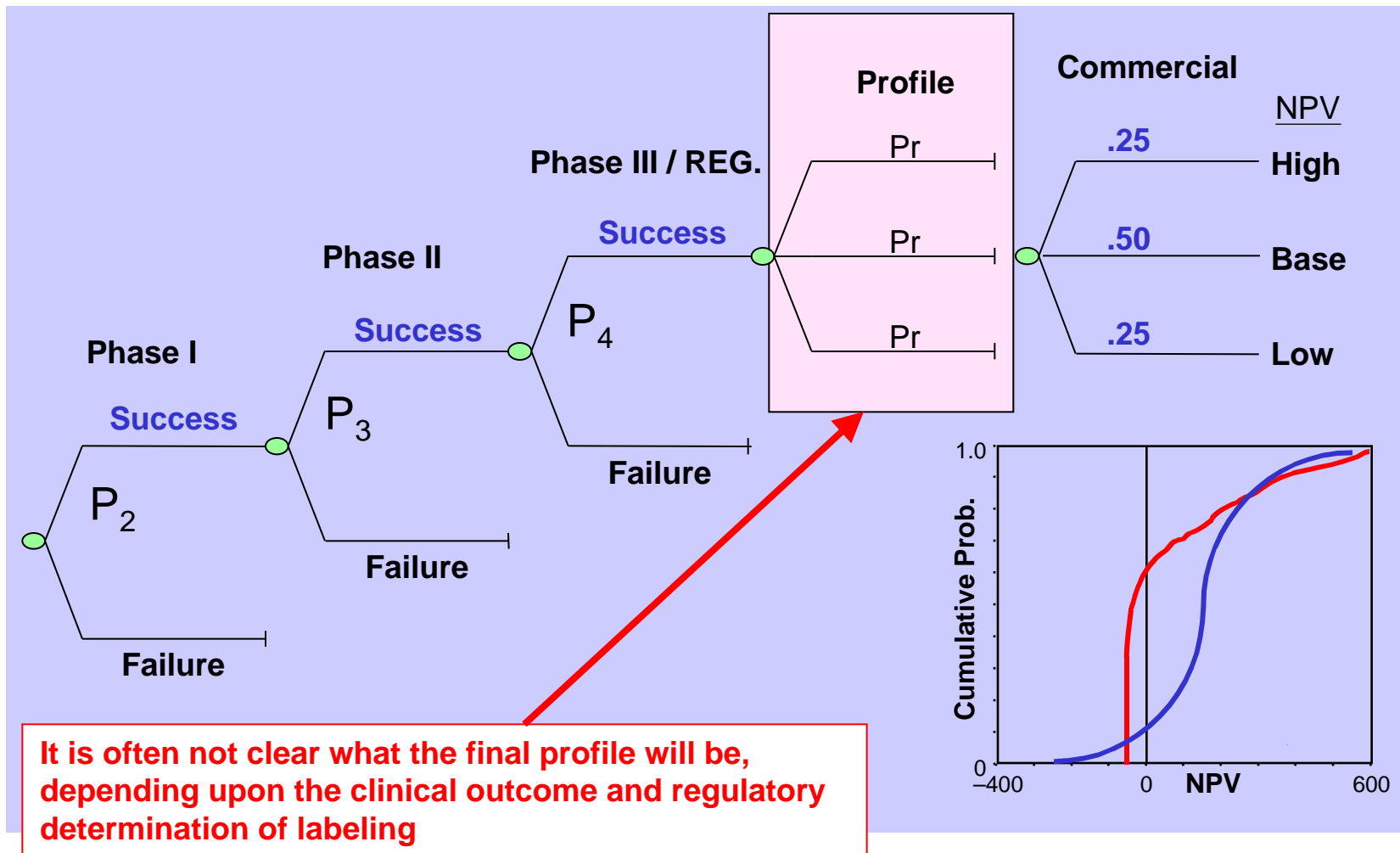
*A penny will hide the biggest star in the universe if you hold it close enough to your eye. -Samuel Grafton*

“Skipping out” clinical/regulatory success typically reveals uncertainties important to decision makers.



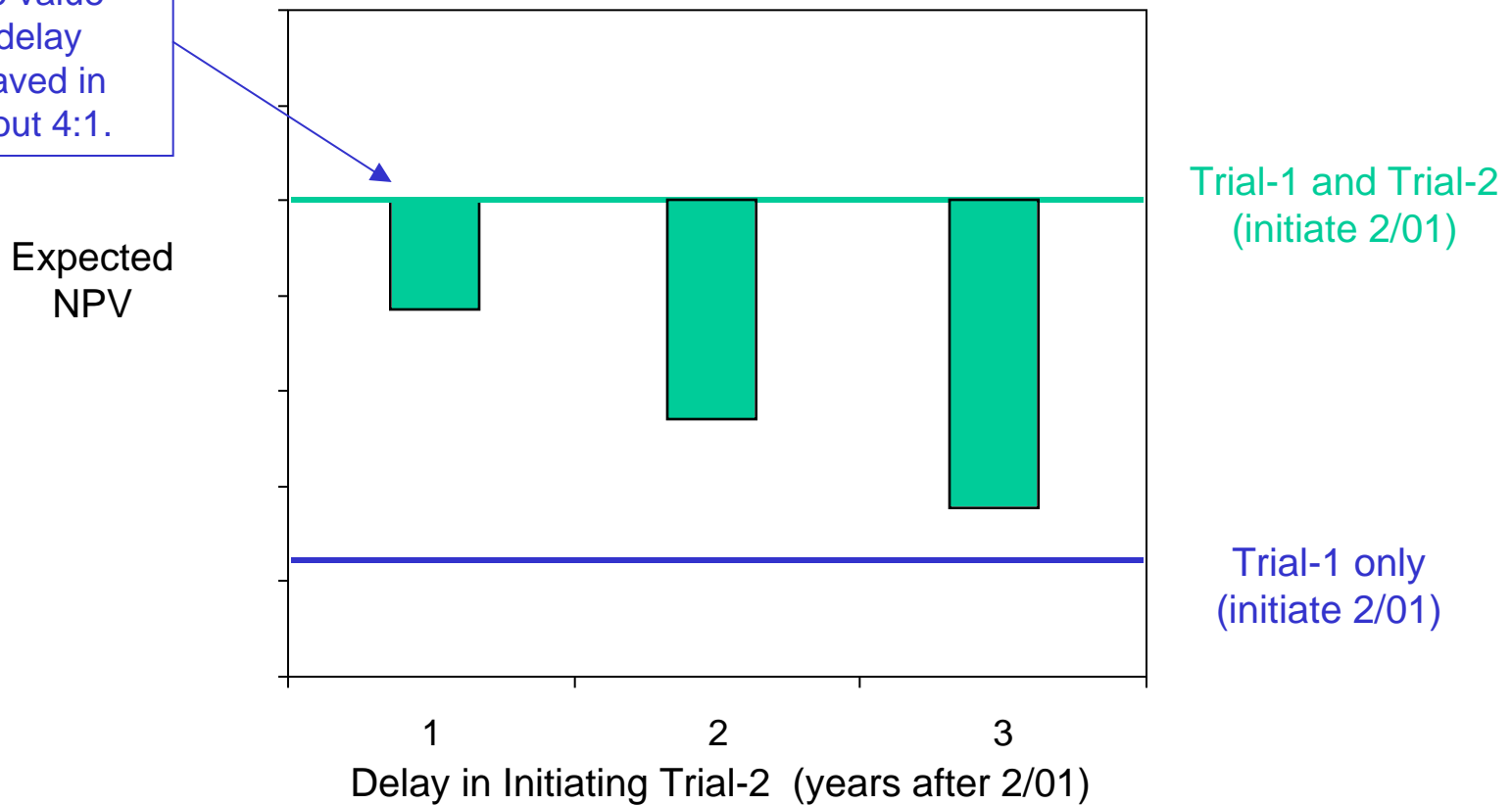
*Doubt comes in at the window when inquiry is denied at the door. –Benjamin Jowett (1817-1893)*

Drug clinical trial success uncertainties have a profound impact on any analysis, often requiring a careful interpretation of the probability distributions.



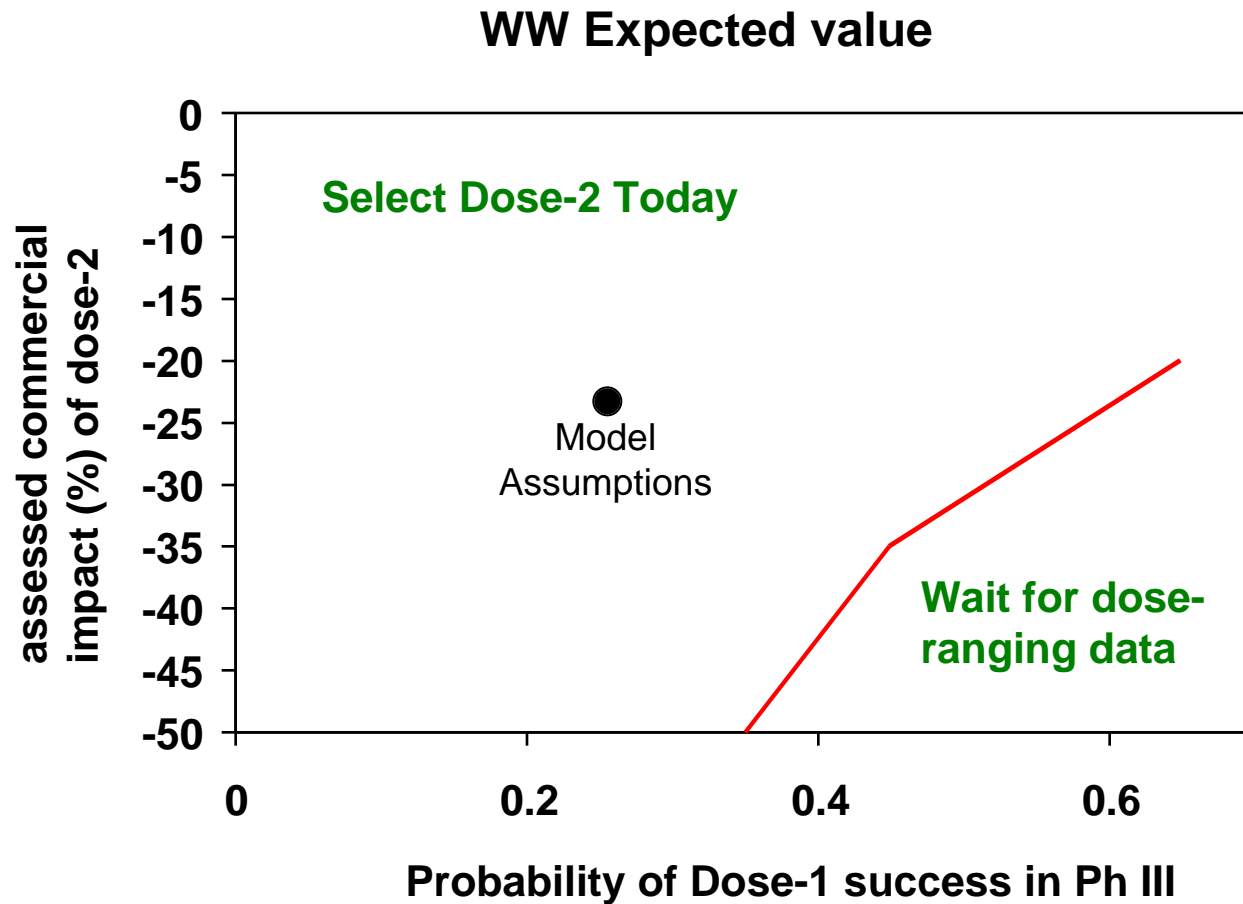
Where R&D cost is a concern, the impact on value of delay can be illustrated. In this case, doing only one trial vastly increased regulatory risk, thus lowering EV.

In the first year alone, more value was lost in delay than was saved in cost, by about 4:1.



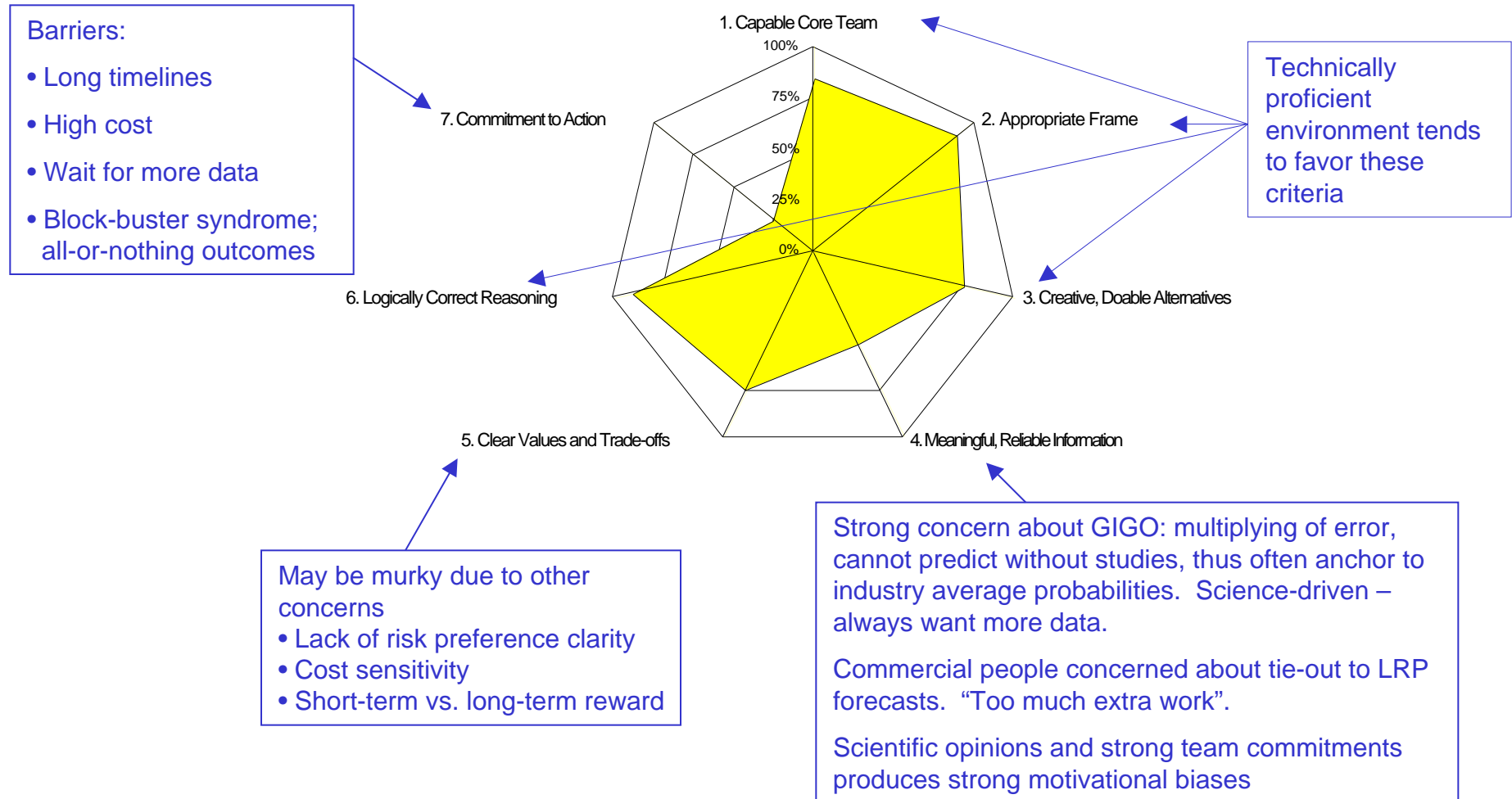
*Conceal a flaw, and the world will imagine the worst. -Martial (Marcus Valerius Martialis)*

Dual sensitivity often provides decision-makers with a means to judge the assessment of key competing uncertainties, typically clinical risk vs. commercial assessment.



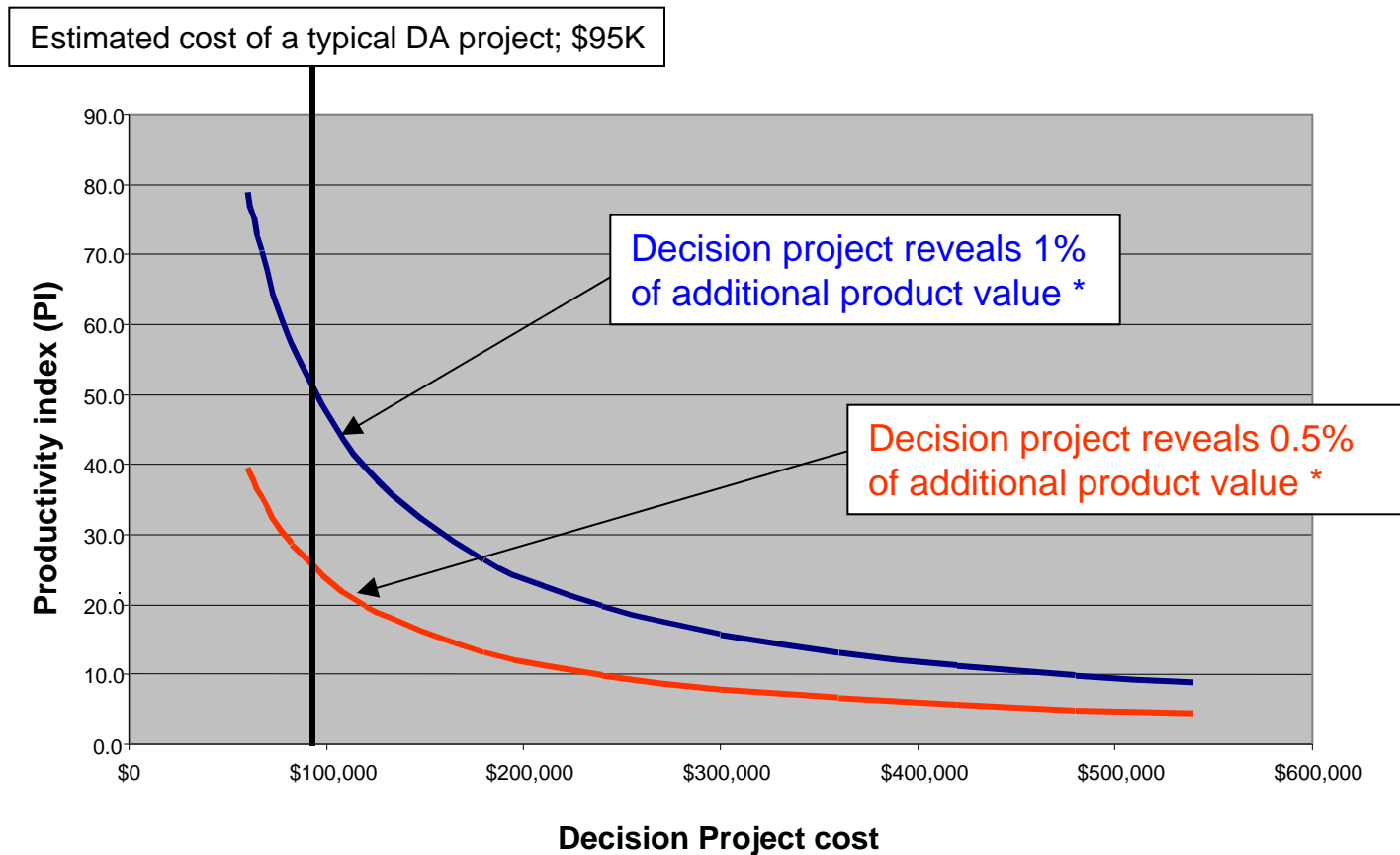
*There are two ways to slide easily through life: to believe everything or to doubt everything; both ways save us from thinking.*  
-Theodore Rubin

# Patterns of Decision Quality are probably typical for R&D intensive, high risk, high reward endeavors.



*The nice thing about standards is that there are so many of them to choose from. -Andrew S. Tanenbaum*

Because of the high development cost, and high commercial reward, careful analysis of strategic alternatives for an average Phase-III compound is a highly productive activity



\* Based upon the expected value of a hypothetical phase-III compound ~ \$500MM

*Westheimer's Discovery: A couple of months in the laboratory can save a couple of hours in the library. -Frank H. Westheimer, chemistry professor (1912- )*

# QUESTIONS

*The secret of life is honesty and fair dealing. If you can fake that, you've got it made. -Groucho Marx*



Good project management is key to delivery of a quality decision.

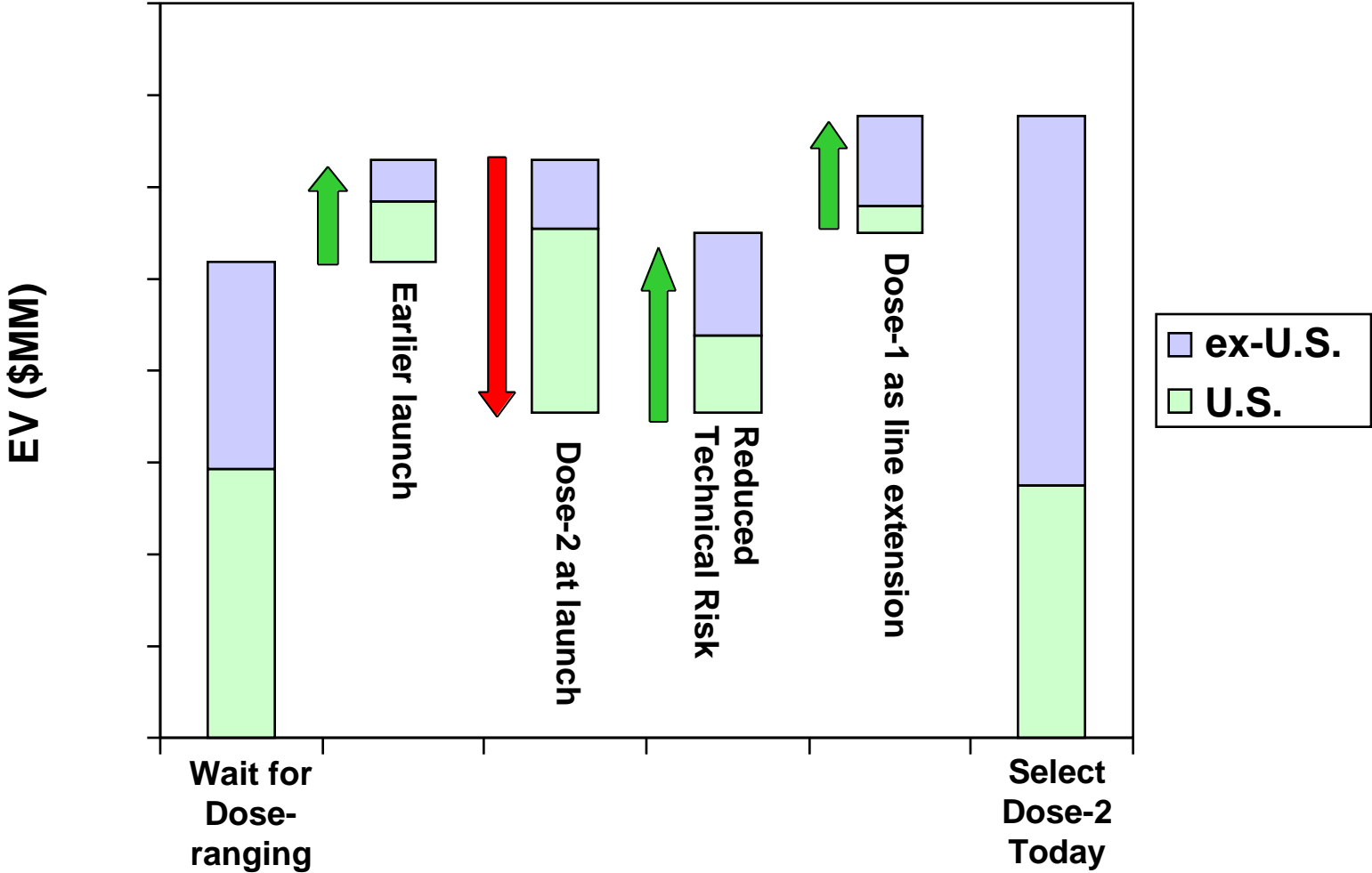
**Decision Analysis Project Timeline**

Week of:	August			September				October				November				
	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20	27
Final Presentation												■				
Management Input	■		■									■				
Core Team Meeting	■	■		■		■		■		■	■					
Scope & Frame	█															
Structuring			█													
Commercial & Technical Assessment				█												
Modeling & Preliminary Calculations					█											
Analysis & Refinements								█								
Conclusions, Recommendations, & Project archiving											█					

*The appropriate timing depends on the scale and complexity of the decision.*

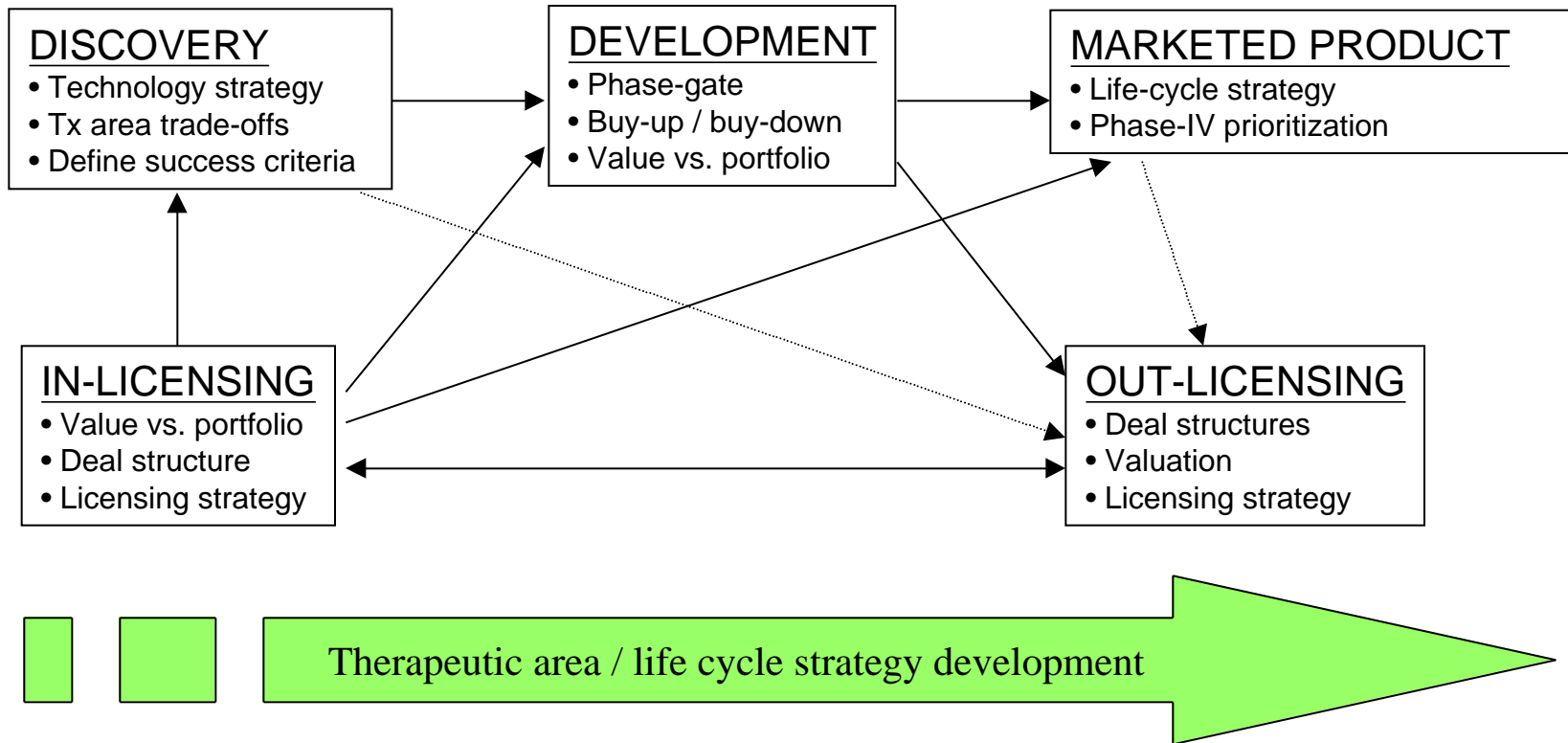
*Do not believe that it is very much of an advance to do the unnecessary three times as fast. -Peter Drucker (1909-)*

Waterfalls are well-suited for illustrating the contributions of various decision options and/or uncertainties in the analysis.



*Conceal a flaw, and the world will imagine the worst. -Martial (Marcus Valerius Martialis)*

# Comprehensive Decision Support and Portfolio Analysis should address all stages of the product life cycle



The DDP/DA elements considered in portfolio analysis are applied across a broader range of assets, but to a lesser depth, than those of a typical asset-specific analysis.

	Asset-specific analysis	Portfolio Analysis
Goals	<ul style="list-style-type: none"> <li>◆ best strategic options that maximize the value of an asset</li> </ul>	<ul style="list-style-type: none"> <li>◆ best combination of projects that meets our strategic and financial goals</li> </ul>
Alternatives	<ul style="list-style-type: none"> <li>◆ several creative strategy alternatives</li> <li>◆ often evaluate multiple product profiles</li> </ul>	<ul style="list-style-type: none"> <li>◆ one momentum strategy for each project</li> <li>◆ usually define one profile per project</li> </ul>
Uncertainties	<ul style="list-style-type: none"> <li>◆ asset-specific model</li> <li>◆ all relevant uncertainties</li> </ul>	<ul style="list-style-type: none"> <li>◆ uniform model across all projects</li> <li>◆ a few key uncertainties</li> </ul>
Values	<ul style="list-style-type: none"> <li>◆ potential to create new value, while highlighting resource options</li> <li>◆ a few key value measures, e.g., eNPV, productivity, perhaps others</li> </ul>	<ul style="list-style-type: none"> <li>◆ maximizes existing value within fixed resource targets</li> <li>◆ multiple value measures, e.g. eNPV, productivity, phase balance, therapeutic area / franchise balance, others</li> </ul>
Relationships	<ul style="list-style-type: none"> <li>◆ The portfolio is updated with asset-specific analyses as they occur.</li> <li>◆ Portfolio data can serve as a backdrop for assessing the value of the strategic options generated in asset-specific analyses.</li> </ul>	